



Basic Logic Gates

1. AND Gate

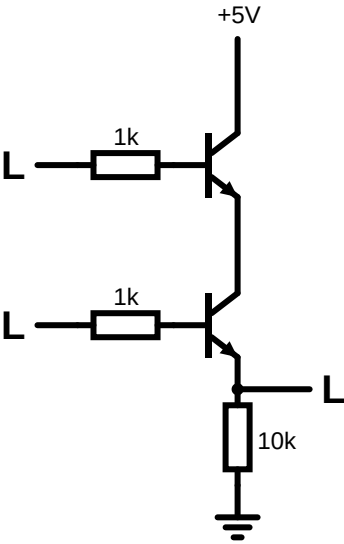
- **Symbol:**

•

 or

&
- **Boolean Expression:** ($Y = A \cdot B$)
- **Function:** Outputs 1 only if both A and B are 1.

A	B	Y (A · B)
0	0	0
0	1	0
1	0	0
1	1	1

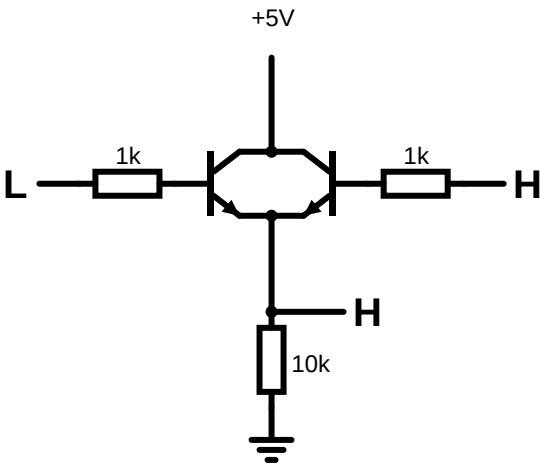


2. OR Gate

- **Symbol:**

+
- **Boolean Expression:** ($Y = A + B$)
- **Function:** Outputs 1 if any input is 1.

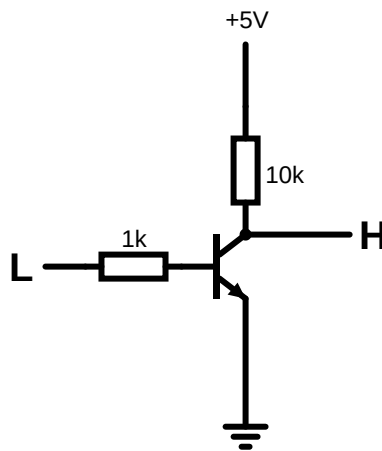
A	B	Y (A + B)
0	0	0
0	1	1
1	0	1
1	1	1



3. NOT Gate

- **Symbol:**  or 
- **Boolean Expression:** ($Y = \overline{A}$)
- **Function:** Inverts the input.

A	Y = NOT A
0	1
1	0

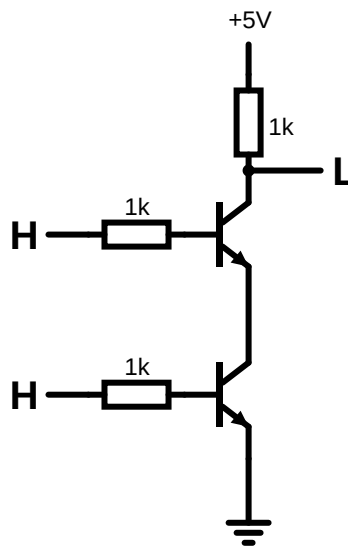


Universal Gates

4. NAND Gate

- **Boolean Expression:** ($Y = \overline{A \cdot B}$)
- **Function:** Outputs 0 only if both inputs are 1.

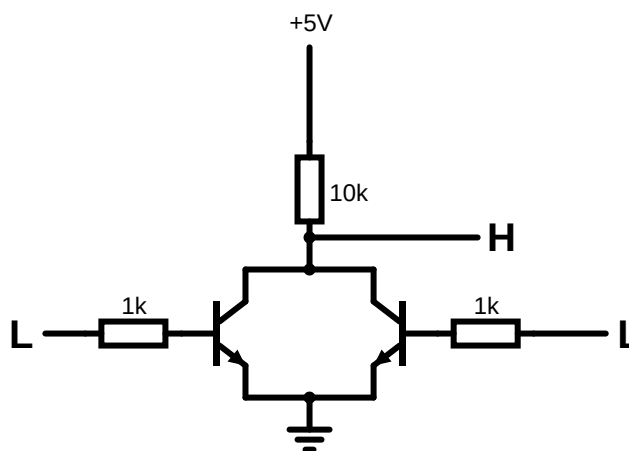
A	B	Y = NAND
0	0	1
0	1	1
1	0	1
1	1	0



5. NOR Gate

- **Boolean Expression:** $(Y = \overline{A + B})$
- **Function:** Outputs 1 only if both inputs are 0.

A	B	Y = NOR
0	0	1
0	1	0
1	0	0
1	1	0



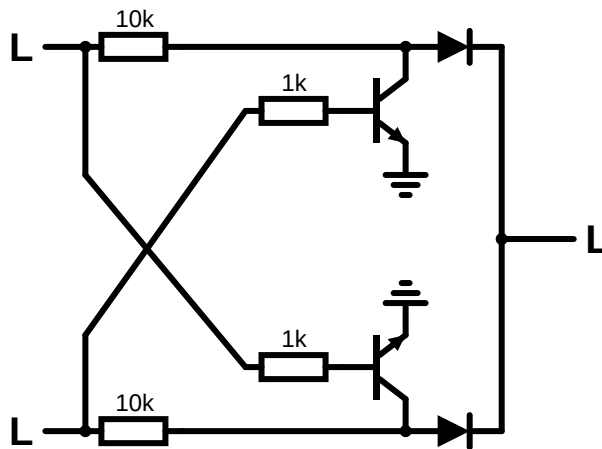


Other Derived Gates

6. XOR Gate (Exclusive OR)

- **Boolean Expression:** ($Y = A \oplus B = A\bar{B} + \bar{A}B$)
- **Function:** Outputs 1 if inputs are different.

A	B	Y = XOR
0	0	0
0	1	1
1	0	1
1	1	0



7. XNOR Gate (Exclusive NOR)

- **Boolean Expression:** ($Y = \overline{A \oplus B} = AB + \bar{A}\bar{B}$)
- **Function:** Outputs 1 if inputs are the same.

A	B	Y = XNOR
0	0	1
0	1	0
1	0	0
1	1	1